

Tom Burr, Curriculum Vita

Bio

Tom Burr received BS degrees in mathematics and physics and a Ph.D. in statistics. His dissertation involved estimating gene flow in genetically subdivided populations. From 1992 to 2002 he was a statistician with the Nuclear Safeguards Systems Group at Los Alamos National Laboratory, and from 2002 to present he has been in the Statistical Sciences Group at Los Alamos National Laboratory. Tom's main statistical application areas are in non-proliferation including nuclear, chemical, and biological threats, all of which require attention to uncertainty.

Research interests include model uncertainty, multivariate time series, multivariate calibration, and many exploratory data analysis methods including clustering and classification. Safeguards applications for these areas include remote monitoring, nuclear material assay, and nuclear materials accounting. In addition, challenges in tomographic gamma scanning to assay nuclear material lead to empirical Bayes approaches via Markov Chain Monte Carlo methods. Tom has also worked on fraud detection in Medicare claims and in the internal revenue service claims, and collaborated with bioinformatics and molecular biology groups involving population genetics, disease modeling, and applications of phylogenetic trees to molecular epidemiology.

Since 1992 Tom has co-authored over 250 technical reports including more than 100 conference proceedings and approximately 85 refereed articles, some of which are listed below.

Education

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| 1992 | Ph.D. Statistics | Florida State University |
| 1988 | M.S. Statistics | Florida State University, Florida State University Fellow |
| 1986 | B.S. Physics | University of North Carolina-Asheville, Summa Cum Lauda |
| 1981 | B.S. Mathematics | Clemson University, Summa Cum Lauda with honors |

Professional Experience

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| 1992-present | Technical Staff Member |
| | Los Alamos National Laboratory, Los Alamos NM |
| 1990-1992 | Statistical Consultant, Florida State University Statistical Consulting Center |
| 1981-1985 | Physics and Mathematics Instructor, Naval Nuclear Power School, Orlando, Florida |

Awards/Grants/Fellowships

LANL Award of Excellence for significant contributions to the stockpile stewardship program, 2007

Grant to present research on the origin of HIV/AIDS at the Royal Society Discussion on the Origins of HIV and the AIDS Epidemic, 2000

Los Alamos National Laboratory Distinguished Performance Awards: Internal Revenue Service Fraud Detection project, 1996; Materials Protection, Control and Accounting in the former Soviet Union, 1996.

Grant to present sensor fusion research at Statistics in Chemistry Gordon Research Conference, New Hampton, New Hampshire, 1995

Grant to attend Statistical Methods in Molecular Biology Conference, Berkeley CA, March 1992

Office of Naval Research Fellow 1986 -1989

Florida State University Fellow 1986 -1988

Most Outstanding Applied Statistics Ph.D. Student, 1986 -1987, Florida State University

Sue King Dunkle Mathematics Award, Clemson University 1981

R.F. Poole Alumni Scholar, Clemson University 1977-1981

Principal Investigator for more than 20 Los Alamos National Laboratory projects, 1992-present.

Approximately 85 referred journal articles, proceedings, book chapters, from 1992 to present

Refereed publications in groups of 5, reverse chronological order

Burr T., Hamada M., Impacts of Model Fidelity on Simulated Gamma Spectra in Estimating Nuclear Safeguards Systems Performance, submitted

Burr T., Croft S., Williams B., White M., Hanson K., Meta-analysis options for inconsistent nuclear measurement, submitted

Tobin S., et al., Technical Cross-Cutting Issues for the Next Generation Safeguards Initiative's

Spent Fuel Nondestructive Assay Project, to appear, Journal of Nuclear Materials Management

Burr T., Hamada M., Finding Test Statistic Thresholds Using Simulation and Model Fitting with an Application to Radiation Detection, to appear, Quality Engineering

Burr, T., Hamada M., Simultaneous Estimation of Computer Model Parameters and Model Bias, to appear, Applied Radiation and Isotopes

Burr T., Budlong-Sylvester K., Demuth S., Hamada M., Howell J., Suzuki M., others, Strengthened Nuclear Safeguards: A Statistical View in the Context of Combining Process Monitoring and Nuclear Material Accounting Data, to appear Journal of Nuclear Materials Management

Burr T., Kuhn K., Tandon L., Tompkins D., Measurement Performance Assessment of Analytical Chemistry Analysis Methods using Sample Exchange Data, International Journal of Chemistry 3(4)_DOI: 10.5539/ijc.v3n4p40, 2012.

Burr T., Bakel A., Bryan S., Budlong-Sylvester K., Damico J., Demuth S., Ehinger M., Garcia H., Howell J., Johnson S., Krebs J., Myers K., Orton C., Thomas M., Roles for Process Monitoring in Nuclear Safeguards at Aqueous Reprocessing Plants, to appear Journal of Nuclear Materials Management

Picard R., Burr T., Hamada M., Estimation for Radiation Portal Monitoring, **submitted**

Burr T., Croft S., Reed C., Least-Squares Fitting with Errors in the Response and Predictor, **submitted**

Burr T., Conlin J., Galloway J., Henzl V., Hu J., Menlove H., Swinhoe M., Tobin S., Trelue H., Ulrich T., Uncertainty Quantification for New Approaches to Spent Fuel Assay, to appear Nuclear Science and Engineering.

Hamada M., Lohr S., Hamada C., Burr T., Estimating a Proportion from Repeated Sampling of a Growing Population, to appear, Quality Engineering

Vardeman S., Hamada M., Burr T., Morris M., Wendelberger J., Jobe J., Moore L., Wu H., An Introduction to Statistical Issues and Methods in Metrology for Physical Science and Engineering, **submitted**, Statistics Reviews.

Burr T., Hamada M., Howell J., Modeling and Simulation for Nuclear Material Accounting and Process Monitoring in Nuclear Safeguards, International Journal of Research and Reviews in Applied Science 8(3), 270-282, 2011.

Burr T., Hamada M., Cremers T., Weaver B., Croft S., Howell J., Vardeman S., Measurement Error Models and Variance Estimation in the Presence of Rounding Error Effects, Accreditation and Quality Assurance Journal for Quality, Comparability and Reliability in Chemical Measurement 16, 347-359, 2011.

Garcia H., Burr T., Coles G., Edmunds T., Garrett A., Gorensen M., Hamm L., Krebs J., Kress R., Lambertia V., Schoenwald D., Tzanos C., Ward R. Integration of Facility Modeling Capabilities for Nuclear Nonproliferation Analysis, Progress in Nuclear Energy, 1-16, 2011.

Burr T., Suzuki M., Howell J., Hamada M., Longo C., Signal Estimation and Change detection in Tank Data for Nuclear Safeguards, Nuclear Instruments and Methods in Physics Research 640 200–221, 2011.

Burr T., Hamada M., Hengartner, Impact of Spectral Smoothing on Gamma Radiation Portal Alarm Probabilities, Applied Radiation and Isotopes 69, 1436-1446, 2011.

Burr T., Predicting Virus Evolution, Chapter 13, 269-287, Bioinformatics: Trends and Methodologies, InTech: Rijeka, 2011.

Burr T., Suzuki M., Howell J., Hamada M., Loss Detection Results on Simulated Tank Data Modified by Realistic Effects to appear, Journal of Nuclear Science and Technology.

Burr T., Kawano T., Talou P., Pen F., Hengartner N., Graves T., Alternatives to the Generalized Least Squares Solution to Peele's Pertinent Puzzle, Algorithms 4(2), 115-130, 2011.

Burr T., Kawano T., Talou P., Pen F., Hengartner N., Defense of the Generalized Least Squares Solution to Peele's Pertinent Puzzle, Algorithms 4(1), 28-39, 2011.

Burr T., Hamada M., Song J., Wolinsky M., Special Topics in Pattern Recognition with Applications in Nonproliferation book chapter on pattern recognition, Nova Science, 2011.

Vardeman, S., Hamada M., Burr T., Wendelberger J., Moore L., Morris M., Wu H., Jobe M., Elementary Statistical Methods and Measurement Error, The American Statistician 64(1), 46–51, 2010.

Burr T., Phylogenetic trees in Bioinformatics, Current Bioinformatics 5(1),40-52, 2010.

Burr T., Hamada M., Graves T., Myers S., Augmenting Real Data With Synthetic Data: an Application in Assessing Radio-Isotope Identification Algorithms, Quality and Reliability Engineering International 25:899-911, 2009.

Burr T., Michalak S., Picard P., Statistical Challenges in BioSurveillance, in Mathematical and Statistical Estimation Approaches

in Epidemiology, Springer, Netherlands, Editors: Chowell, G., Hyman, J., Bettencourt, L., Castillo-Chavez, C., 2009.

Burr T., Hamada M., Radio-isotope Identification Algorithms for NaI Gamma Spectra, *Algorithms* 2(1): 339-360, 2009.

Burr T., Statistical Methods in Nuclear Safeguards, Proliferation Resistance, Safeguards and Physical Security in *Nuclear Engineering Handbook*, 2009

Burr T., Chowell G., Daily Estimation of the Reproduction Number R_t in Structured and Nonstructured Populations, *Mathematical Biosciences and Engineering* 6(2), 239:259, 2009.

Burr T., Myers K., Background Suppression Effects on Signal Estimation, *Applied Radiation and Isotopes* 67:1729-1737, 2009.

Gattiker J, Burr T., Bayesian Estimation of the Source and Suppression Effects in Vehicle Radiation Signatures, *Journal of Nucl. Mater. Management*, 37(3); 14-24, 2009.

Burr T., Weier D., Hypothesis Testing: Frequentist Versus Bayesian With Examples From Nuclear Safeguards, *Journal of Nucl. Mater. Management*, 37(2): 16-22, 2009.

Burr T., Data Mining in Genome Wide Association Studies, *Encyclopedia of Data Mining*, 2nd Ed, 2008.

Burr T., Cluster Analysis in Fitting Mixtures of Curves, *Encyclopedia of Data Mining* 2nd Ed, 2008.

Picard R., Burr T., Networked Sensors for Cargo Screening, *IEEE Sensors* 8(8):1389-1396, Aug 2008.

Burr T., Chowell G., Signatures of Inhomogeneity in Disease Outbreaks, *Mathematical and Computer Modelling* 48:122-140, 2008.

Burr T., Spencer F., Weier D., Weiz R., Statistical Algorithm For Sampling From a Growing Population, *Journal of Nucl. Mater. Management*. 36(3): 30-35, 2008.

Burr T., Myers K., Signatures for Several Types of Naturally Occurring Radioactive Material, *Applied Radiation and Isotopes* 66: 1250-1261, 2008.

Burr T., Butterfield K., Variance Results for the Second and Third Reduced Moments in Neutron Multiplicity Counting for randomly triggered or signal-triggered counting gates, *Nuclear Instruments and Methods in Physics Research A*, doi:10.1016/j.nima.2008.06.010, 2008.

Burr T., Statistical Methods in Nuclear Nonproliferation Activities at Declared Facilities, *Nuclear Nonproliferation*, editors: Kory Budlong-Sylvester and Jim Doyle, 2007.

Budlong-Sylvester K., Pilat J., Burr T., Evaluating International Safeguards Systems, *Nuclear Nonproliferation*, editors: Kory Budlong-Sylvester and Jim Doyle, 2007.

Burr T., Fry H., McVey B., Sander E., Cavanaugh J., Neath A., Performance of Variable Selection Methods in Regression Using Variations of the Bayesian Information Criterion, *Comm. in Stat- Simulation* 37:507-520, 2007.

Burr T., Doak J., Distribution Free Discriminant Analysis, *Intelligent Data Analysis*, 11(6): 651-662, 2007.

Burr T., Gattiker J., Myers K., Tompkins G., Alarm Criteria in Radiation Portal Monitoring, *Applied Radiation and Isotopes*, 65: 569-580, 2007.

Burr T., Koster F., Picard R., Forslund D., Wokoun D., Joyce E., Brillman J., Froman P., Lee J., Computer-Aided Diagnosis with Potential Application to Rapid Detection of Diseases Outbreaks, *Statistics in Medicine* 26: 1857-1874, 2007.

Burr T., Hengartner N., Overview of Physical Models and Statistical Approaches for Weak Gaseous Plume Detection Using Infrared Hyperspectral Imagery, *Sensors* 6: 1721-1715, <http://www.mdpi.org/sensors/list06.htm#issue12>, 2006.

Burr T., Foy B., Fry H., McVey B., Characterizing Clutter in the Context of Detecting Weak Gaseous Plumes in Hyperspectral Imagery, *Sensors* 6: 1587-1615, 2006, <http://www.mdpi.org/sensors/list06.htm#issue11>, 2006.

Burr T., Graves T., Klamann R., Michalek S., Picard R., Hengartner H., Accounting for Seasonal Patterns in Syndromic Surveillance Data for Outbreak Detection, *BioMedCentral, Medical Informatics and Decision Making*, 6:40, 2006.

Burr T., Hemphill G., Multi-Component Radiation Measurement Error Models, *Applied Radiation and Isotopes* 64(3): 379-385, 2006.

Burr T., Gattiker J., Mullen M., Tompkins G., Statistical Evaluation of the Impact of Background Suppression on the Sensitivity of Passive Radiation Detectors, in *Statistical Methods in Counter Terrorism*, New York: Springer, 2006.

Burr T., Chowell G., Observation and model error effects on parameter estimates in susceptible-infected-recovered epidemiological models, *Far East Journal of Theoretical Statistics* 19(2): 163-183, 2006.

Heasler P., Burr T., Reid B., Gesh C., Bayne C., Estimation Procedures and error analysis for inferring the total Plutonium produced by a graphite-moderated reactor, *Reliability Engineering and System Studies*, 91, Issue: 10-11: 1406-1413, 2006.

Burr T., Gattiker J., The Impact of Model Uncertainty on Biological Parameter Estimates, *Far East Journal of Theoretical Statistics*, 13(2) 153-174, 2005.

Burr T., Methods for Choosing Clusters in Phylogenetic Trees, *Encyclopedia of Data Mining* John Wang, ed., 2005.

Burr T., Cluster Analysis in Fitting Mixtures of Curves, *Encyclopedia of Data Mining* John Wang, ed., 2005

Burr T., Fry H., Biased Regression: The Case for Cautious Application, *Technometrics* 13, 284-296, 2005.

Burr T., Jacobson A., Mielke, A., A Dynamic Global Radio Frequency Noise Survey as Observed from the FORTE Satellite at 800-km Altitude, *Radio Science* 40(6), RS6016, doi:10.1029/2005RS003246, 30 December 2005.

Crooks W., Spearing D., Rennie J., Worl L., Burr T., For the Storage of Plutonium Metal, is a Surveillance Program for Pressurization Necessary?, *J. Nucl. Mater. Manage.*, 33(2), 2005.

Burr T., Charlton W., Nakhleh C., Assessing Confidence in Inferring Reactor Type and Fuel Burnup: A Markov Chain Monte Carlo Approach *Nucl. Inst and Methods in Physics Research* 555, Issue: 1-2: 426-434, 2005.

Brillman J., Burr T., Forslund D., Joyce E., Picard R., Umland E., Modeling Emergency Department Visit Patterns for Infectious Disease Complaints: Results and Application to Disease Surveillance, *BioMedCentral, Medical Informatics and Decision Making* 5, 4, 2005.

Burr T., Sampson T, Vo D., Statistical Evaluation of FRAM γ -ray Isotopic Analysis Data, *Applied Radiation and Isotopes* 62, 931-940, 2005.

Burr T., Jacobson A., Mielke A., A Global Radio Frequency Noise Survey as Observed from the FORTE Satellite at 800-km Altitude, *Radio Science* 39, RS 4005, doi:10.1029/2002RS002865, 2004.

Forslund D., Joyce E., Burr T., Picard R., Wokoun D., Umland E., Brillman J., Froman P., Koster F., Setting Standards for Improved Syndromic Surveillance, *IEEE Engineering in Medicine and Biology Magazine* 65-70, Jan/Feb 2004.

Doak J., Burr T., Moore D., Schaefer J., Modeling of a Fuel Fabrication Facility using Python and SimPy, *Proc Pycon 2004 Washington DC* March 24-26, www.python.org/pycon/dc2004/papers, 2004.

Burr T., Krick M., Mielke A., Statistical Evaluation of Two Triggering Systems: an Application of Conditional Variance, *Nucl. Inst and Methods in Physics Research A* 524: 314-323, 2004.

Burr T., Coulter C., Howell J., Wangen, L., Solution Monitoring: Quantitative and Qualitative Benefits to Nuclear Safeguards, *Nuclear Science and Technology* 40(4), 256-263, 2003.

Burr T., Hemphill G., Longmire V., Smith M., The Impact of Combining Nuclear Material Categories on Uncertainty, *Nucl. Inst and Methods in Physics Research A* 505: 707-717, 2003.

Burr T., Gattiker J., Gerrish P., An Investigation of Error Sources and Their Impact in Estimating the Time to the Most Recent Ancestor of Spatially and Temporally Distributed HIV Sequences. *Statistics in Medicine* 22(9):1495-1516, 2003.

Burr T., Gattiker J., LaBerge G., Genetic Subtyping using Cluster Analysis, *Special Interest Group on Knowledge Discovery and Data Mining Explorations*, 3, 33-42, 2002.

Stanbro W., Hsue .S, Burr T., Collins M., Wells C., Eccleston G., Charlton W., Advanced Approaches to the International Oversight of Neptunium: Challenges and Opportunities, *Journal of Nucl. Mater. Management*, 30(2): 60-65, 2002.

Burr T., Doak J., Gattiker J., Stanbro W., Assessing Confidence in Phylogenetic Trees: Bootstrap versus Markov Chain Monte Carlo, *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences*, Vol 1, 181-187, 2002.

Burr T., Charlton W., Stanbro W., An Evaluation of Safeguards Approaches for Neptunium, *Journal of Nuclear Science and Technology* 3 (38), 2001.

Burr T., Maximally Selected Measures of Evidence of Disease Clustering, *Statistics in Medicine*, 20, 1443-1460, 2001.

Burr T., Quasi-Equilibrium Theory for the Distribution of Rare Alleles in a Subdivided Population: Justification and Implications, *Theoretical Population Biology* 57(3): 297-306, 2000.

Burr T., Knepper P., A Study of the Effect of Measurement Error in Predictor Variables in Nondestructive Assay, *Applied Radiation and Isotopes* 53(4-5): 547-555, 2000.

Skourikhine A., Burr T.m Linguistic Analysis of the Nucleoprotein Gene of Influenza A Virus, *IEEE Symposium on Bioinformatics and Biomedical Engineering*, 193-199, 2000.

Burr T., Charlton W., Stanbro W., Comparison of Signature Pattern Analysis Methods in Molecular Epidemiology, *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences*, 473-479, 2000.

Charlton W., Burr T., Stanbro W., Budlong-Sylvester K., Gattiker J., Simulation Tool for Predicting Classical Epidemiology Data for Infectious Diseases Using a Probabilistic Model, *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences*, 489-495, 2000.

Burr T., Stanbro W., Sampling and Statistical Issues in Neptunium Safeguards, *Journal of Nucl. Mater. Manage*, 28(2): 17-21, 2000.

Burr T., Myers G., Hyman J., Skourikhine A., Impacts of Misspecifying the Evolutionary Model in Phylogenetic Tree Estimation, *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences*, 481-487, 2000.

Stanbro W., Charlton W., Hemberger P., Poths J., Burr T, Fearey B., The Use of Stable Xenon Isotope Monitoring in Strengthened Safeguards at Large Reprocessing Plants, *Journal of Nucl. Mater. Manage*, 28(2): 22-26, 2000.

Burr T., Charlton W., Stanbro W., Comparison of Signature Pattern Analysis Methods in Molecular Epidemiology. *Proceedings of the International Conference on Mathematics and Engineering Techniques in Medicine and Biological Sciences* 2: 473-479, 2000.

Burr T., Skourikhine A., Bruno W., Macken C., Confidence Measures for Evolutionary Trees: Applications to Molecular Epidemiology. Proc. IEEE Inter. Conf. on Information, Intelligence and Systems, Genetics and Evolution Section 107-114, 1999.
 Burr T., Pickrell M., Rinard P., Wenz T., Data Mining: Applications to Nondestructive Assay Data, Journal of Nucl. Mater. Manage. 27(2): 40-47, 1999.
 Burr T., Comparison of a Fuzzy Forecaster to a Statistically Motivated Forecaster, IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans 28(1): 121-127, 1998.

In revision:

Hengartner N., Matzner-Lober E., Rouviere L., Burr T., Multiplicative Bias Corrected Nonparametric Smoothers with Application to Nuclear Energy Spectrum Estimation, **submitted** Canadian Journal of Statistics

Invited Papers or Talks

Burr T, Howell J, Suzuki M, Crawford J, Williams T., Evaluation of loss detection methods in solution monitoring for nuclear safeguards, invited talk, American Nuclear Society, Knoxville TN Apr 5-9, 2009.
 Burr T., Methods for Choosing Clusters in Phylogenetic Trees, 2004 American Statistical Association Chapter Meeting
 Burr T, Myers G, Hyman J. The Origin of AIDS – Darwinian or Lamarkian?, Phil. Trans. R. Soc. Lond. B.356:877-887, 2001.
 Burr T, Mercer D, and Prettyman T., Comparison of Bayesian and Classical Reconstructions of Tomographic Gamma Scanning for Assay of Nuclear Materials, LA-UR-98-2380, invited paper presented at the Spring Research Conference on Statistics in Industry and Technology, Santa Fe, NM, June 3-5, 1998, and published in the American Statistical Association Proceedings Section on Physical and Engineering Sciences, 1998.
 Burr T, Dreicer J, Pickrell M., Shielding-Related Assay Challenges and Experimental Results in Nuclear Safeguards, LA-UR-99-3073, presented at the American Nuclear Society 1999 Winter Meeting, Long Beach, California, November 14 -18, 1999; in Trans. Am. Nucl. Soc. 81, 240-241, (invited paper), 1999.

Conference Participation and Proceedings (not refereed, short list, the full list contains approximately 100)

Regular speaker at: Joint Statistical Meetings, Spring Research Conference on Statistics in Industry and Technology, Institute of Nuclear Materials Management, Biennial CDC/ASTDR Conference

Organized invited session regarding statistical issues in measurement processes.

Statistical Issues in Measurement Processes: Item-Specific Bias.

The Increasing Role of Computer Models in Nuclear Material Assay, Burr, T., Beddingfield, D., and Tobin, S.

Selected talk titles:

Burr, T., Ehinger, M., Howell, J., Pomeroy, G., Reducing inspector uncertainty via solution monitoring, Proceedings of the Institute of Nuclear Materials Management Annual Conference (INMM) 2008.
 Leishman, D., Eeckhout, E., Gibson, W., Burr, T., The Integrated Knowledge Engine, a tool for rapid diversion analysis of complex data in an operating facility, INMM, 2008
 Dixon, E., Pickrell, M., Geist, W., Boyer, B., Burr, T., Beddingfield, D., Neutron Monitoring of Vacuum System Cold Traps to Detect Undeclared HEU production at Gas Centrifuge Enrichment Plants INMM 2007.
 Burr, T., Tobin, S., Beddingfield, D., The Increasing Role of Computer Models in Nuclear Material Assay Joint Research Conference on Statistics in Quality Industry and Technology June 7-9, 2006, Knoxville, TN, Proceedings of the Joint Statistical Meetings of the American Statistical Association, 2006.
 Burr, T., Hemphill, G., Ticknor, T., Boyle, C., Felsher, P., Frank, M., Martinez, B., and Preston, L., Propagation of Variance Software for Nuclear Material Accounting, INMM, 2006.
 Umland, E., Brillman, J., Kostter, F., Froman, P., Joyce, E., Forslund, D., Picard, R., Burr, T., Sweeill, C., Castle, S., Bersell, K., Fielding the Bio-Surveillance Analysis, Feedback, Evaluation and Response (B-SAFER) System in Albuquerque New Mexico, Biosurveillance Conference, 2006.
 Burr, T., Picard, R., Sager, K., and Roberts, R., Sensor Optimization for Radiation Portal Monitoring, INMM, 2006.
 Burr, T., Doak, J., Howell, J., Solution Monitoring: A Surveillance Measure and a Component of Nuclear Material Accounting, Tom Burr, Justin Doak, and John Howell, Proceedings INMM, 2006
 D. Beddingfield, T. Burr et al., Measurement of the LASW-1 and 2 water storage buildings at Tokai Reprocessing Facility, LACP05-1225, 2006.
 T. Burr, J. Doak, S. Croney, Statistical Issues in Nuclear Material Accounting at Mixed Oxide Fuel Fabrication Facilities, LA-UR-05-8433, Sponsor delaying submission for publication due to politics in Japan, 2005.
 T. Burr, K. Budlong-Sylvester, W. Crooks III., E. Garcia, T.K. Li, K. Thomas; JNC: Mineo Fukushima, Masato Torusuzu, Naoko Inoue, Munetaka Myochin, Joint Study of Safeguards System for Dry Reprocessing Methods (Phase III), LA-CP-05-0837, 2005
 Bleasdale, S., Burr, T., Scovel, J., Disaggregating Time Series, Army conference on Applied Statistics, Monterey CA, 2005,
 Burr, T., Charlton, W., Heasler, P., Moore, L., Design and Analysis of Experiments, Santa Fe, Oct 11-14, 2005: Experimental design issues in a procedure for inferring total Pu produced, 2005.
 Burr, T., Elliot, J., Fry, H., and McVey, B., Heasler, P., Burr, T., Reid, B., Gesh, C., Sander, E. Approximate posterior probabilities for system evaluation of an image analysis problem, Proceedings of the ASA Section on Physical and Engineering Sciences, 2003.
 Burr, T., Fry, H., and McVey, B., Sander, E. Chemical Identification using Bayesian Model Averaging, Proceedings of the ASA Section on

Physical and Engineering Sciences, 2002.

Burr, T., Application of the ARBI statistic to pyrochemical reprocessing, submitted by T. Burr by request to Japan Nuclear Cycle Development Inst , 2003.

Burr T, Hemphill G, Longmire V, Smith M, Impact of the Number of Measurement Categories on Measurement Error, INMM, 2002.

Burr T, Apt K, Budlong-Sylvester K, Stanbro WD, Wells C, Distinguishing Natural from Man-made Disease Outbreaks, INMM, 2002.

Olinger C, Burr T, Dawson D, Kwei L, Longmire V, Realizing Benefits from Technology For Inventory Monitoring, INMM, 2002.

Longmire V, Hemphill G, Burr T, Ticknor T, Frank M, Roybal G, Method for Estimating Cumulative Facility Inventory Difference, INMM, 2002.

Fukushima M, Hori M, Li T, Burr T, Thomas K, A Study of Safeguards System for Dry Reprocessing, INMM, 2002.

Budlong Sylvester K, Pilat J, Darby J, Burr T, Risinger D, Greene M, Guryan C, Acquisition Path Analysis and Integrated Safeguards, INMM, 2002

Burr, T., Smith, M, Gattiker, J, Bracken, D., Detecting and Characterizing Equilibrium in Calorimetry, ASA proceedings, 2001.

Burr, T., Macken, C., Molecular Epidemiology of Influenza: A Model Biological Warfare Agent, LA-UR-99-3679, 1999.

Burr, T. et. al, Molecular Epidemiology of Influenza: A Model Biological Warfare Agent, presented at the DOE Chemical & Biological Nonproliferation Program Summer '99 Meeting, Washington, D.C., July 20 -22, 1999.

Burr, T., Prettyman, T., Bias Reduction in Tomographic Gamma Scanning: Experimental and Simulation Results, presented at the 1999 Spring Research Conference on Statistics in Industry and Technology, Minneapolis/St. Paul, Minnesota, June 2-4, 1999, Proceedings of the Section on Physical and Engineering Sciences, 253-258, 1999.

Burr, T., Weier, D., Kuzminykh, M., Comparison of a US Approach and a Russian Approach to the Historical Analysis of Inventory Differences, INMM, 1999.

Burr, T., Weier, D., Kuzminykh, M., Goryunov, V., Ryazanov, B., Karpenko, A., Nekrasov, V. US and Russian Collaborations on the Analysis of Inventory Differences Using Propagation of Variance, INMM, 1999.

Burr, T., Knepper, P., and Longmire, V. Inventory Difference Evaluation at the Los Alamos Plutonium Facility, 6th International Conference on Facility Operations-Safeguards Interface, Jackson Hole, Wyoming, September 20-24, 1999.

Burr, T., Mercer, D., Prettyman, T. A Study of Total Measurement Error in Tomographic Gamma Scanning to Assay Nuclear Material with Emphasis on a Bias Issue for Low-Activity Samples, INMM, 1998.

Hakkila A. and Burr, T. Safeguards Considerations in the Study of Proliferation Resistance of Plutonium Disposition Options INMM, 1997.

Burr, T., Coulter, C., Prommel, J. Variance Propagation by Simulation (VPSim), INMM 38, 1997.

Burr, T., Pickrell, M., Prettyman, T., Rinard, P., Wenz, T. A Study of Data Fusion Methods Applied to Nondestructive Assay Data, INMM, 1997.

Burr, T., Rivenburgh, R., Scovel, J., White, J. Comparing Candidate Hospital Report Cards, Proceedings of the ASA Joint Statistical Meetings, Statistical Graphics Section, Anaheim Ca, 1997.

Burr, T., Coulter, A., Wangen, L. Solution Monitoring: Quantitative Benefits to Safeguards, IAEA Symposium on International Safeguards, Vienna, Austria, 1997.

Burr, T., Statistical Methods of Combining Information: Applications to Sensor Data Fusion, Joint ESARDA/INMM workshop on Science and Modern Technology for Safeguards, Arona Italy, 1996.

Burr, T., Wangen, L., Process Fault Detection and Nonlinear Time Series Analysis For Anomaly Detection in Safeguards, IAEA Symposium on International Safeguards, SM-333/118, 1994.

Burr, T., Jones, J., Wangen, L., Multivariate Diagnostics and Anomaly Detection for Nuclear Safeguards, INMM , 1994.

Burr, T., Material Balance Areas and Frequencies for Large Reprocessing Plants, INMM, 1994.

Burr, T., Coulter, C., Hakkila, E., Ai, H., Kadokura, I., Fujimaki, K. Statistical Methods for Detecting Loss of Materials using Near-Real Time Accounting Data, INMM, 1995.

Olinger, C., Burr, T., Vnuk, D. Acoustic Resonance Spectroscopy Intrinsic Seals, INMM, 1994.

Technical Reports (short list, the full list contains approximately 250)

Burr, T., et al., Initial Review of BioSense Analytics, 2006

Burr, T., et al., Patient Level Demographics in BioSense Data Streams, 2006

Burr, T., et al., Generation of Synthetic Biosense Data, 2006

Fitzgerald, M., Picard, R., Burr, T., Surveillance Strategies and Decision Making for Port Surveillance, LA-UR-06-7736, 2006.

Burr, T., Beddingfield, D., Tobin, S., The Increasing Role of Computer Models in Nuclear Material Assay, LA-UR-06-0626, 2006

T. Burr, G. Tompkins, "Monitoring Sensor Health in a Changing Environment," LA-UR-06-0168, 2005.

McVey, B, Burr, T, Fry, H, Distribution of Chemical False Positives for Hyperspectral Image Data, LC-CP 02-521, 2002.

Burr, T. Still No Free Lunches for Cross Validation, Los Alamos National Laboratory document LA-UR-98-2170, manuscript under revision, 1998.

Burr, T., Coulter, C., Wangen, L. Benchmark Data for a Large Reprocessing Plant for Evaluation of Advanced Data Analysis Algorithms and Safeguards System Design, LA-13414-MS, ISPO-397, 1998.

Byrd, R., Mayo, D., Miller, M., Burr, T., Urban, W. Development of a Nuclear Fingerprinting Detector Based on BGO/BC454 Scintillators, LA-13524-MS, SRD. 1998.

Bleasdale, S., Burr, T., Scovel J., Disaggregating Time Series Data, 1997, (this formed the basis of S. Bleasdale's Ph.D. dissertation, UNM Statistics Dept, 1999).

Burr, T., Coulter, C., Prommel, J. VPSim: Variance Propagation by Simulation (Users Manual), LA-13382-MS, Dec, 1997.

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Burr, T., Wangen, L. Development and Evaluation of Methods for Safeguards Use of Solution Monitoring Data, LA-13185-MS, (ISPO 389), 1996.

Burr, T., Wangen, L. Enhanced Safeguards via Solution Monitoring, LA-13186 (ISPO 390), 1996.

Burr, T., Zardecki, A., Concentration Estimation Using Least Squares Applied to Multiple-Wavelength Lidar, NIS-7/96-415, 1996.

Burr, T., Coulter, C., Hakkila, E., Li, T., Wangen, L. Near-Real-Time Accounting Study for the Rokkasho Reprocessing Plant, N-4/93-1041, Los Alamos National Laboratory, 1993.

Burr, T., Predicting Linear and Nonlinear Time Series with Applications in Nuclear Safeguards and Nonproliferation, N-4/93-1263, 1993.

Burr, T., Kurien, T. Estimating and modeling gene flow for a spatially distributed species, Florida State University Department of Statistics Technical Report No. M837, 1990.

Technical Presentations

Approximately 5 per year since 1992 to internal and external sponsors or at professional meetings.

Book Reviews: approximately 1 book review per year for Statistics in Medicine, Technometrics, American Geophysical Union

Burr T., review of Statistics in Human Genetics and Molecular

Burr T., review of Spatial Statistics

Burr T., review of Modelling and Estimation of Measurement Errors

Burr T., review of Introduction to Matrix Analytical Methods in Stochastic Modeling

Burr T., review of Modeling Longitudinal Data

Burr T, review of Modeling Financial Time Series using Splus

Burr T., review of Spatial Cluster Modeling

Burr T., review of Simulation and Inference for Stochastic Differential Equations

Burr T., review of Introduction to Machine Learning and Bioinformatics

Burr T., review of Pattern Recognition and Machine Learning

Burr T., review of Hilbert-Huang Transform Analysis of Hydrological and Environmental Time Series

Computing Experience

Extensive Fortran, R, and S+ programming, one significant C++ project completed, another C++ and S+ project ongoing. Some programming in Python, Java and Visual Basic. Most comfortable under Unix environment (Sun Workstation), some experience with Borland C++ under Windows. Experience with several major statistical packages (in addition to S+ and R) such as SPSS, BMDP, SAS, and Minitab while working as a statistical consultant at the Florida State University Statistical Consulting Center from August 1989-May 1992. Overall, I rate my computational experience as good, including recent implementation of Markov Chain Monte Carlo methods to implement an empirical Bayesian approach to tomographic gamma scanning.

Teaching/Presentation

1981-1985 Taught math and physics to both officers and enlisted in the Naval Nuclear Power School

1988-1989 Taught two different undergraduate statistics courses (general) as FSU grad student.

1994-present: Prepared and presented two different in-depth (40 contact hours in 1 week) statistics in measurement control and nuclear safeguards courses for presentation in the former Soviet Union to technically trained (BS level or higher in scientific disciplines) nuclear facility personnel (1994). Organizer for course on statistical methods in safeguards presented annually since 1997.

1992-present: Frequent program-review presentations to both managers and technical people and presentation of papers at professional meetings.

Consulting

Three years experience (1989-1992) as the Florida State University Consulting Center Research Assistant to the Director, Duane Meeter who was also my dissertation advisor.

Consulting **topics** included: ANOVA, Design of Experiments, pattern recognition (classification), time series, categorical data analysis. Clients: Primarily graduate students in education, psychology, biology, and business. Also,

some consulting for state agencies, including Florida Health Care Cost Containment Board, Florida Dept. of Health and Rehabilitative Services.

Experience under my current job (1992-present) as technical staff member in the Nuclear Safeguards Systems Group at Los Alamos National Laboratory (LANL). Consulting topics have included: ANOVA, Design of Experiments, Linear and Nonlinear regression, multivariate calibration using partial least squares, Bayesian estimation methods, scalar and vector time series analysis, classification of messy (some missing and some mislabeled) data. Clients: Primarily fellow technical staff members with graduate degrees in physics or chemistry, also several Federal Agencies. Also frequently advise/mentor students, including working with Shirley Bleasdale in the area of disaggregating time series data and in detecting signals in time series data. This work formed Ms. Bleasdale's Ph.D. dissertation at the UNM statistics department. Also consult with other divisions/groups within the laboratory. Recent projects include: detecting fraudulent health-care claims by applying and developing pattern recognition techniques, and "filtering" out false alarms in vector-valued time series data of sensor data from satellites by applying and developing cluster analysis techniques.

Professional Affiliations and Contributions

Member American Statistical Association, Member Institute of Nuclear Materials Management, Honorary lifetime member of Sigma Pi Sigma Honor Society of Physics Students

Referee for many journals including: Nuclear Instruments and Methods in Physics Research, Applied Radiation and Isotopes, IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans, Journal of Nuclear Materials Management. Statistics in Medicine, Technometrics, Bioinformatics, Sensors, IEEE Associate Editor, Mathematics and Engineering Techniques in Medicine and Biological Sciences, Environmental Science and Technology, BMC Medical Informatics and Decision Making, Analytical Chemistry, Mathematical Biosciences and Engineering, Mathematical and Computer Modelling, Encyclopedia of Data Warehousing and Mining, Transactions of the American Geophysical Union, Radio Science

Associate Editor: Algorithms

Received 6-sigma training and course certificate through StraightLine Performance Solutions, 2009.

Served 1-year term on LANL directed research and development (LDRD) committee: 2009.

Reviewed several small business grants under hyperspectral data analysis proposal calls.

Nutshell description

My technical experience is quite broad and reasonably deep. I take pride in the frequent praises I receive for clearly and accurately communicating simple or complex statistical approaches, information, and conclusions to physical scientists (nuclear engineers, physicists, biologists). I enjoy teaching small classes of statistics students or physical scientists who want to apply statistical methods. Participants in our statistics courses have given me very high recommendation to their peers. I have also been successful in guiding upper level graduate students and postdocs here at LANL. In particular, one PhD candidate based her dissertation on joint work with me involving disaggregating time series and I have collaborated with several postdocs. In short, I enjoy the challenges associated with doing or explaining highly quality statistical data analysis and believe that I can be successful in demonstrating the value that sound statistical reasoning adds to scientific or technical projects.